

**Interface Control Document Between  
EOSDIS Core Systems (ECS) and the  
Oak Ridge National Laboratory (ORNL)  
Distributed Active Archive Center  
(DAAC) for the ECS Project**

**September 1996**



**GODDARD SPACE FLIGHT CENTER**  
GREENBELT, MARYLAND

INTERFACE CONTROL DOCUMENT  
between the  
EOSDIS Core System (ECS) and the  
Oak Ridge National Laboratory (ORNL)  
Distributed Active Archive Center (DAAC)  
for the ECS Project

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## Preface

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This document is a formal contract deliverable with an approval code 1. It requires Government review and approval prior to acceptance and use. This document is under ECS contractor configuration control. Once this document is approved, Contractor approved changes are handled in accordance with Class I and Class II change control requirements described in the EOS Configuration Management Plan, and changes to this document shall be made by document change notice (DCN) or by complete revision.

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## Abstract

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This Interface Control Document (ICD) defines the functional and physical design of each interface between ECS and the ORNL DAAC-Unique System and includes the data contents and format for each interface. The modes (options) of data exchange for each interface are described as well as the conditions required for each mode or option. Additionally, data rates, frequencies, file sizes, error conditions, and error handling procedures are included or a place holder has been inserted for updating as the information becomes available. The sequence of exchanges is described, as are the details for communications protocols or physical media for each interface.

This ICD is consistent with the external systems interface requirements at the ORNL DAAC, as described in the Earth Science Data and Information System (ESDIS) Project -- Level 2 Requirements, the Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS level 3 requirements) and the Interface Requirements Document (IRD) Between ECS and the Version 0 System.

**Keywords:** ORNL, ECS, DCE, API, Metadata, biogeochemical, browse, DAAC, product delivery record, PDR, PDRD, production acceptance notification, Kftp, ESnet, ODL, OSF

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Abbreviations and Acronym

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# 1. Introduction

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## 1.1 Identification

This Interface Control Document (ICD), Contract Data Requirements List (CDRL) Item 029 whose requirements are specified in Data Item Description (DID) 209/SE1, is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

## 1.2 Scope

This Interface Control Document (ICD) defines the external interfaces (i.e., between ECS and non-ECS components) within the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) -Unique System for the ECS Release B.

ECS Releases are keyed to mission support: Release Ir1 provides support to TRMM Early Interface Testing and Science Algorithm I&T. Release B testbed provides the functional capabilities needed to support early ESDIS Ground System Testing for the EOS AM-1 and Landsat 7 missions. Release B provides support to EOS AM-1 Mission Operations and Science Operations, and it provides support to ESDIS Ground System Certification Testing for the EOS AM-1 and Landsat 7 missions. Release B also provides archive and distribution services for the Landsat 7 mission. In addition support is provided for the continuing biogeochemical research effort at ORNL. Releases C & D provide evolutionary enhancements to the ECS services provided in the earlier Releases.

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This ICD does not address:

- a. Data flows for V0-to-V1 data migration — these data flows are fully addressed in the Version 1 Data Migration Plan White Paper, 1/95.
- b. Version 0 catalog interoperability data flows; these are included in the Interface Control Document Between the EOSDIS Core System (ECS) and the Version 0 System.

The Earth Science Data and Information System (ESDIS) Project has responsibility for the development and maintenance of this ICD. Any changes in the interface requirements must be agreed to, and assessed at the ESDIS Project Level. This ICD will be approved under the signature of the ESDIS Project Manager.

This document reflects the technical baseline maintained by the ECS Configuration Control Board in accordance with ECS technical direction (see Section 2.2).

### 1.3 Purpose and Objectives

This document is written to formalize the interpretation and general understanding of the interfaces between ECS and non-ECS components of the ORNL DAAC-Unique System. This document is intended to provide clarification and elaboration of the ECS/non-ECS systems interfaces at the ORNL DAAC to the extent necessary to assure hardware, software, and operational service compatibility within the end-to-end system.

This document provides a point of mutual control of external interface definitions between the ECS and the ORNL DAAC via the ESDIS Configuration Control Board (CCB).

### 1.4 Status and Schedule

This is the final ICD for the ECS/non-ECS systems interfaces at the ORNL DAAC which will be implemented in ECS Release B. This ICD has been submitted as an ECS Project CCB approval Code 1 document. At the Government's option, this document may be designated to be under full Government CCB control. Changes may be submitted for consideration by Contractor and Government CCBs under the normal change process at any time.

Within this document are some interfaces that are yet To Be Determined (TBD), To Be Resolved (TBR), and/or To Be Supplied (TBS) items. A Work-Off Plan is included in Appendix A for resolving these items. This plan provides the following information:

- a. ICD I/F Issue Number
- b. ICD Reference Paragraph
- c. ICD Issue Priority
- d. ICD Issue Type - Description
- e. Work-off Plan Task(s)
- f. Projected Resolution Date
- g. Risk Assessment.

### 1.5 Organization

This document is organized in 5 sections:

- a. Section 1 provides information regarding the identification, scope, purpose and objectives, and organization of this document.
- b. Section 2 contains information about documentation relevant to this ICD, including parent, applicable, and information documents.
- c. Section 3 provides an overview of the interfaces, with a brief description of the elements involved.
- d. Section 4 provides an overview of the data exchange approaches.

- e. Section 5 contains a description of each data exchange between the ECS and the ORNL DAAC-Unique System, the data transfer method, and descriptions of the data format.
- f. Appendix A contains a table which identifies a Work-off Plan for all TBRs, TBSs and/or TBDs.
- g. Appendix AB contains a list of abbreviations and acronyms.

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## 2. Related Documentation

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### 2.1 Parent Documents

The following are parent documents from which this document's scope and content derive:

193-208-SE1-001	Methodology for Definition of External Interfaces for the ECS Project
301-CD-002-003	System Implementation Plan for the ECS Project
423-10-01-5	Goddard Space Flight Center, Earth Science Data and Information System (ESDIS) Project Level 2 Requirements, Volume 5: EOSDIS Version 0; through CH-01, 9/13/93
423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work, through CN-14, 4/25/95
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS) Revision A through CH-06, 4/25/95
505-10-20	Goddard Space Flight Center, System Interface Control Plan for the Earth Science Data and Information System (ESDIS) Project
505-41-11	Goddard Space Flight Center, Interface Requirements Document Between EOSDIS Core System (ECS) and the Version 0 System

### 2.2 Applicable Documents

The following documents are referenced herein and are directly applicable to this document. In the event of conflict between any of these documents and this ICD, this document shall take precedence. Please note that Internet links cannot be guaranteed for accuracy or currency.

206-CD-001-002	Version 0 Analysis Report for the ECS Project
209-CD-001-003	Interface Control Document Between EOSDIS Core System (ECS) and the NASA Science Internet
305-CD-008-001	Release A SDPS Data Server Subsystem Design Specification for the ECS Project
305-CD-009-001	Release A SDPS Ingest Subsystem Design Specification for the ECS Project
305-CD-012-001	Release A CSMS Communications Subsystem Design Specification for the ECS Project

305-CD-024-002	Release B SDPS Data Server Subsystem Design Specification for the ECS Project
305-CD-025-002	Release B SDPS Ingest Subsystem Design Specification for the ECS Project
305-CD-028-002	Release B CSMS Communications Subsystem Design Specification for the ECS Project
305-CD-029-002	Release B CSMS Management Subsystem Design Specification for the ECS Project
311-CD-008-001	Release B Science Data Processing Segment (SDPS) Database Design and Database Schema Specifications for the ECS Project
311-CD-003-005	Communications and System Management Segment (CSMS) Database Design and Database Schema Specifications for the ECS Project
313-CD-004-001	Release A CSMS/SDPS Internal Interface Control Document for the ECS Project
313-CD-006-002	Release B SDPS/CSMS Internal Interface Control Document for the ECS Project
611-CD-002-001	Release A SDPS/CSMS Operator's Manual for the ECS Project
819-RD-001-001	EOSDIS Core System (ECS) Application Programming Interface (API) Interface Definition Document (IDD)
160-TP-002-001	Version 1 Data Migration Plan [for the ECS Project], Technical Paper
175-WP-001-001	HDF-EOS Primer for Version 1 EOSDIS (White Paper for the ECS Project)
210-TP-001-006	Technical Baseline for the ECS Project, 2/14/96
163-WP-001-001	An ECS Data Provider's Guide to Metadata in Release A
420-TP-014-001	The Population Process for ECS Metadata in Release A
420-TP-015-001	B.0 Earth Science Data Model
420-TP-016-001	Backus-Naur Format (BNF) Representation of the B.0 Earth Science Data Model
CCSDS 641.0-B-1	Consultative Committee for Space Data Systems (CCSDS), Parameter Value Language Specification (CCSD0006), Blue Book
ORNL-MD-001-01	ORNL Data/Metadata Design and Specifications Document
none	Goddard Space Flight Center, ECS Technical Direction No. 11, "PDR Technical Baseline," 12/6/94
none	Goddard Space Flight Center, Science Data Plan for the EOS Data and Information System Covering EOSDIS Version 0 and Beyond, Document Version 3, 7/94

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none	HyperText Markup Language Specification Version 3.0, Internet Draft, D. Raggett
	Deleted
none	Davis, Randy; University of Colorado Laboratory for Atmospheric and Space Physics: User's Guide for the Object Description Language (ODL) Processing Software Library, Release 2.1 DRAFT, 3/13/91
none	Planetary Data System Standards Reference, Version 3.1, 8/94 (WWW access: <a href="http://stardust.jpl.nasa.gov/stdref/stdref.html">http://stardust.jpl.nasa.gov/stdref/stdref.html</a> )
RFC 791	Internet Protocol, J. Postel (WWW access: <a href="gopher://ds.internic.net:70/">gopher://ds.internic.net:70/</a> )
RFC 793	Transmission Control Protocol, J. Postel (WWW access: <a href="gopher://ds.internic.net:70/">gopher://ds.internic.net:70/</a> )
RFC 959	File Transfer Protocol, Internet Standards, J. Postel, J. Reynolds (WWW access: <a href="gopher://ds.internic.net:70/">gopher://ds.internic.net:70/</a> )
RFC 1157	A Simple Network Management Protocol (SNMP), J. Case, M. Fedor, M. Schoffstall, J. Davin (WWW access: <a href="gopher://ds.internic.net:70/">gopher://ds.internic.net:70/</a> )

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## 2.3 Information Documents

The following documents, although not directly applicable, amplify or clarify the information presented in this document, but are not binding.

604-CD-001-004	Operations Concept for the ECS Project: Part 1-- Overview
604-CD-002-003	Operations Concept for the ECS Project: Part 2B -- Release B

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### 3. Interface Overview

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The Oak Ridge National Laboratory (ORNL) DAAC is responsible for handling data related to biogeochemical dynamics. This includes biological and physical processes and conditions that govern the storage and fluxes of energy, water, trace gases, carbon, nutrients, and other elements in and between ecosystems and the physical environment. The objectives of the ORNL DAAC are to acquire, process, archive, and distribute biogeochemical data generated primarily through ground-based field investigation as well as remote-sensing techniques. The ORNL DAAC archives data relating to key radiatively and chemically active gases to assess how their fluxes are affected by the oceans, the terrestrial biosphere, and the changing composition of the troposphere. The ORNL DAAC also seeks data that help explain how biogeochemical processes in various types of ecosystems contribute to the formation, dissipation, transport, and fate of trace gases and other elemental fluxes throughout the biosphere—to identify global sources and sinks of those substances. As part of its mandate as a data center, the ORNL DAAC archives biogeochemical data generated by NASA and other agencies or institutions; generates value-added products that synthesize and summarize global biogeochemical data; and supports field investigations by providing assistance in data management, quality assurance, and generation of metadata.

#### 3.1 ECS - ORNL DAAC-Unique System Overview

The ECS support for the ORNL biogeochemical data is collocated with the ORNL DAAC-Unique System at the ORNL. The ECS - ORNL DAAC-Unique System data exchange and user access are supported by communication/networking services through ECS and the Internet.

The interfaces between the ECS and the ORNL DAAC-Unique System are accomplished through the use of ECS standard Application Programming Interfaces (API). These APIs permit development of DAAC-Unique services. The ORNL DAAC develops the server portion of the APIs to support the ECS interfaces. The EOSDIS Core System (ECS) Application Programming Interface (API) Interface Definition Document (IDD) provides an explanation of the prerequisites necessary before a user can successfully invoke APIs within an application program. The API IDD will cover the following: the knowledge that is necessary in order to write the code which calls these capabilities, the ECS architecture, the key mechanisms within ECS, integration and testing requirements, required software libraries, the administrative path to follow to gain approval to call the ECS APIs for a particular application, and the process by which the new application program may be advertised for use by others.

The ECS and the ORNL DAAC-Unique System work in coordination to provide user access, data archive, metadata cataloging and product distribution functions for the biogeochemical dynamics data and associated value-added products in support of NASA field projects and other global change research and policy-making efforts.

The ORNL DAAC is responsible for gathering, ensuring the quality of, documenting, archiving, and distributing the data and data products. The ORNL DAAC, in primarily supporting field projects, has a very human-intensive product generation process. The staff interact with field project PIs to collect metadata. Data sets often come in many small, complex files with incomplete documentation. The staff acquire, validate, document and ingest each data and data product. Although some automation tools have been developed to aid in the ingesting process, the generation of metadata requires a great deal of human intervention.

The ORNL DAAC-Unique System assumes responsibility for the generation of metadata and guide documents for ECS. ECS stores a copy of the metadata and guide documents for ORNL data, receiving and managing data requests from the perspective of ECS users.

The ECS provides the full suite of Communications and System Management Segment (CSMS) services to ORNL. This includes enterprise management for ECS-provided components; interoperability and information transfer between clients and servers; and LAN connections among ECS components and a network interface to other ORNL networks.

The ECS provides the following Science Data Processing Segment (SDPS) subsystems at ORNL: Data Management Subsystem which includes LIM, DIM and data dictionary services; the Interoperability subsystem which provides the advertising service; the Client subsystem which includes the desktop and scientist workbenches; a subset of the Data Server subsystem including the Science Data Server service, the Document Data Server service, the Data Type service, and the administration and schema generation services to support management, storage and searching of metadata; and a subset of the Ingest subsystem to support the ingest of metadata into ECS.

### **3.2 ECS-ORNL DAAC-Unique System Interfaces**

System interfaces between ECS and the ORNL DAAC-Unique System provide the means for transferring ORNL metadata and for sending messages supporting data transfer. Table 3-1 provides an overview of the interfaces between ECS and the ORNL DAAC-Unique System for granule metadata and guide documents and associated metadata along with the information required to implement the interfaces. Table 3-2 contains information about the API supported interfaces. The transfer mechanism for these interfaces are DCE Remote Procedure Calls (RPCs). The interfaces listed in Table 3-1 and 3-2 are described within Sections 4 and 5 of this ICD to support ECS and ORNL-Unique DAAC design and test activities.

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**Table 3-1. ECS-ORNL DAAC-Unique System Interfaces**

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Source	Destination	Message	Data	Transfer Mechanism
ORNL DAAC-Unique System	ECS (via ORNL server)	Product Delivery Record		Kftp
ORNL DAAC-Unique System	ECS (via ORNL server)		Metadata (granule or document)	Kftp
ORNL DAAC-Unique System	ECS (via ORNL server)		Guide Documentation	Kftp
ECS	ORNL DAAC-Unique System	*Product Delivery Record Discrepancy		Kftp
ECS	ORNL DAAC-Unique System	Production Acceptance Notification		Kftp

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\*This message is used only in the event of an error in the Product Delivery Record

**Table 3-2. ECS-ORNL DAAC-Unique System API Supported Interfaces**

Source	Destination	Interface Name
ECS	ORNL DAAC-Unique System	Order Request
ORNL DAAC-Unique System	ECS	Order Status
ECS	ORNL DAAC-Unique System	Order Related Requests
ORNL DAAC-Unique System	ECS	Order Related Results
ORNL DAAC-Unique System	ECS	Granule Metadata Update
ORNL DAAC-Unique System	ECS	Metadata Query
ECS	ORNL DAAC-Unique System	Metadata Query Results
ECS	ORNL DAAC-Unique System	Browse Service Request
ORNL DAAC-Unique System	ECS	Browse Service Results

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## 4. Data Exchange Framework

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Section 4 describes the data exchange framework supporting the ECS - ORNL DAAC-Unique System interfaces presented in Section 3.2. The descriptions include network topologies, internetworking protocols, electronic data exchange, data exchange interfaces, physical media data exchange, data exchange formats and data exchange security. Section 5 describes the data flows between ECS and the ORNL DAAC-Unique System.

### 4.1 Internetworking Protocols

The ECS - ORNL DAAC-Unique physical communication links are supported by internetworking services that are consistent with the Open Systems Interconnection (OSI) reference model, as defined in the International Organization for Standardization, Basic Reference Model of Systems Interconnection (ISO 7498). These services are also described in "Internet Programming; Jamsa Press, Nevada, 1995". Connection-oriented services are provided using the TCP/IP protocol suite [Transmission Control Protocol/Internet Protocol].

#### 4.1.1 Datalink/Physical Protocol - Network Topology

The ECS connects to the ORNL DAAC-Unique System via an FDDI interface on the ECS DAAC FDDI Switch/Router. The ECS DAAC FDDI Switch/Router is connected to a FDDI interface on an ORNL center ORNL-ECS router which in turn is connected to the ORNL external FDDI ring. Also connected to the external FDDI ring are the Energy Sciences Network (ESnet) router and an ORNL firewall which provides access to the center network environment. This configuration is depicted in Figure 4-1.

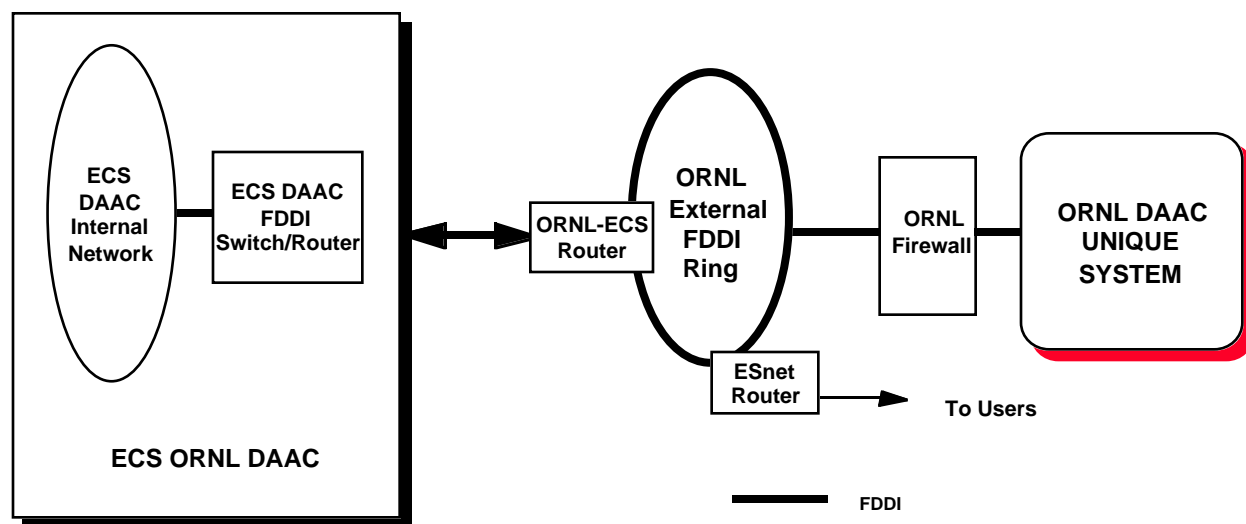
The ORNL DAAC's Internet connection is provided by the Department of Energy's ESnet. Neither EBnet nor NSI has a point of presence at ORNL. Therefore, all Internet and DAAC- to-DAAC traffic to/from the ECS ORNL DAAC will occur via ESnet.

ECS will provide for IP domain name service within the ECS DAAC and assign a domain name consistent with the ECS sites' naming structure.

The ORNL DAAC will provide:

- an ORNL DAAC-supplied router on the ORNL external FDDI ring
- a fiber-based dual-attached FDDI connection from the ECS DAAC FDDI Switch/Router to the ORNL DAAC-supplied router
- a Class C IP network address for use within the ECS DAAC
- the required IP addressing for the connection between the ECS DAAC FDDI Switch/Router and the ORNL DAAC-supplied router
- network administration for the connectivity between ESnet and the ECS DAAC.

The ORNL DAAC, through the campus communications organization, will also be responsible for interfacing with ESnet for the exchange of network management information. Network management includes fault, performance and security management. ESnet staff at ORNL will alert the ORNL DAAC Local System Management (LSM) staff of planned and unplanned network faults such as ESnet circuit faults affecting ORNL, security breaches and provide relevant network performance statistics (on the ESnet backbone that connects ORNL to the Internet) as needed. The ECS-NSI ICD (209-CD-001-003) details the interfaces that ECS has with NASA Science Internet (NSI), the primary Internet Service Provider for ECS. It can be used as a guide in determining which network management information would be useful for ECS.



**Figure 4-1. ECS - ORNL DAAC-Unique System Network Topology**

#### 4.1.2 Internet Protocol (IP)

The Internet Protocol (IP), specified in RFC 791, supports network layer data exchanges between the ECS and the ORNL DAAC-Unique System elements. The network layer provides the transparent transfer of data between transport entities. The IP addresses for the network nodes and data hosts are determined by the time of installation at ORNL.

#### 4.1.3 Transport Control Protocol (TCP)

Connection-oriented transport service is implemented using TCP. TCP, specified in RFC 793, is a connection-oriented, end-to-end reliable protocol designed to fit into a layered hierarchy of protocols which support multi-network applications. It provides for guaranteed delivery of data between pairs of processors in host computers attached to networks within and outside ECS.

The interface between TCP and an application process consists of a set of calls much like the calls an operating system provides to an application process for manipulating files. For example, there are calls to open and close connections and to send and receive data on established connections.

#### 4.1.4 Applications Protocols

ECS provided application protocols in the TCP/IP protocol suite are defined in the following paragraphs.

##### 4.1.4.1 Kerberos File Transfer Protocol (Kftp)

Metadata and guide document file transfers as well as Product Delivery Record, Product Delivery Record Discrepancy and Production Acceptance Notification messages between ECS and the ORNL DAAC-Unique System host computers are accomplished through the use of Kerberos File Transfer Protocol (Kftp). The Kftp provides the same functionality as standard ftp but has an added layer for Kerberos authentication.

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ECS and the interfacing ORNL DAAC-Unique Subsystems supporting Kftp transfer must both host Kerberos client and server software compliant with the Kerberos Network Authentication Service (Version 5) as described in RFC 1510 (e.g., Cygnus CNS V5 (96Q1) using default settings, or MIT v5b6 with MD4 flags set to “off”). The ECS side of the interface provides the required Kerberos key server function.

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##### 4.1.4.2 (Deleted)

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#### 4.2 Distributed Computing Environment (DCE)

ECS supports the Open System Foundation's (OSF) DCE services consisting of multiple components which have been integrated to work closely together. They are the Remote Procedure Call (RPC), the Cell and Global Directory Services (CDS and GDS), the Security Service, DCE Threads, Distributed Time Service (DTS) and Distributed File Service (DFS). The Threads, RPC, CDS, Security, and DTS components are commonly referred to as the “secure core” and are the required components of any DCE installation. DFS is an optional component. DCE also includes administration tools to manage these components.

DCE services support intra-cell communications (within a DAAC) and inter-cell communications (across DAACS). ORNL will support/install DCE services. DCE RPCs provide the transfer mechanism for the ECS - ORNL DAAC-Unique System API supported interfaces. Each DAAC is a DCE cell. Inter-cell trust will be established for this multi-cell architecture. DCE Security Services make use of configuration-controlled Access Control Lists (ACLs) and Kerberos authentication tools to maintain this security. Additional information about DCE can be found in Release B CSMS Communications System Management Subsystem Design Specification (DID 305).

## 4.3 Data Exchange Between ECS and ORNL DAAC-Unique System

### 4.3.1 Application Programming Interfaces (APIs)

Data exchanges that occur between the ECS and the ORNL DAAC-Unique System are through the use of standard ECS provided APIs. These APIs are major data exchange protocols for ECS and the ORNL DAAC-Unique System. The APIs permit development of ORNL DAAC-Unique services. The ORNL DAAC-Unique System provides code to support these ECS APIs and complete the interfaces. Additional information can be found in the API IDD (DID 819) and the Release B CSMS/SDPS Internal Interface Control Document for the ECS Project (DID 313). | CH02

### 4.3.2 Polling with Product Delivery Record and Data Transfer

The ORNL DAAC-Unique System data transfer mechanism for granule metadata and guide documentation and associated metadata is polling with product delivery record. The respective control messages are defined below. The message formats contain both fixed and variable length strings. A zero byte (NULL character) is used as a field separator for variable length strings in the manner of the C programming language, except in the Parameter Value Language (PVL) as noted in Section 4.3.2.2. Field lengths are specified in terms of bytes, where a byte is equal to 8 bits. The specified field lengths do not include the null character used to terminate variable length strings. The associated operator tunable parameters will be included in the operations procedures for the ORNL DAAC-Unique System and ECS, which will be documented in the DAAC Operations Manual (DID 611). | CH02

A control message is rejected when it contains errors or is sent in an inappropriate sequence. The message source receives notification of this rejection, via a control message from the message destination. Error conditions for each of the messages include out-of-bound parameter values, invalid parameter values, and missing values (e.g., message type). In most cases, the message is corrected by the message source, and resent.

Operator tunable parameters for message transfer include:

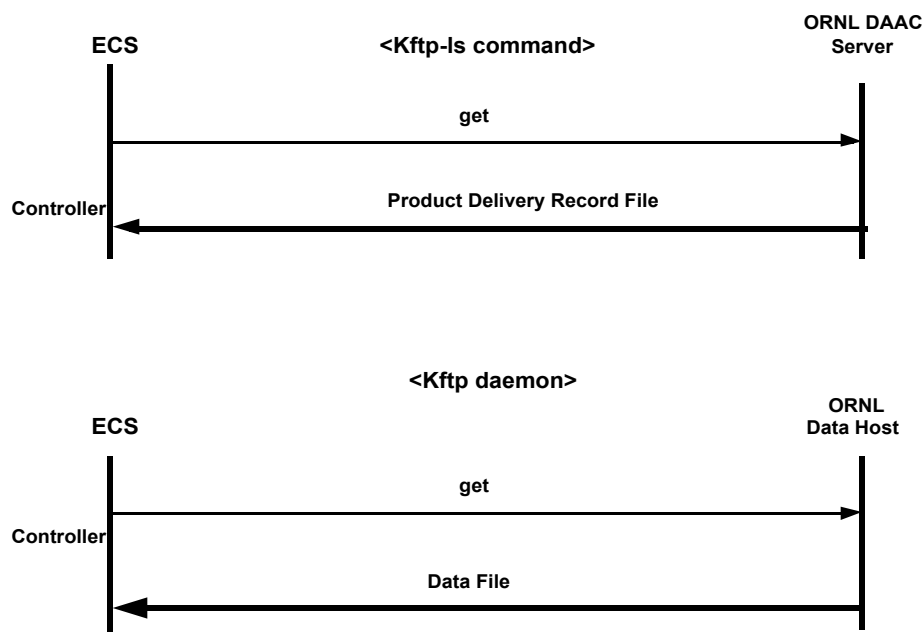
- Time either system waits for a message acknowledgment before sending a message.
- Time between sending a PDR and the time the data will be deleted from the file server if it has not been retrieved.

### 4.3.2.1 Data Transfer

A “Polling With Product Delivery Record (PDR)” transfer mechanism is used by the ECS Ingest Subsystem to acquire granule metadata or guide documentation and its associated metadata at the ORNL DAAC. The ECS side of the interface is equipped with a daemon - a computer program which invokes this data transfer mechanism using the Kftp client. Specifically, the daemon:

- Automatically, and with operator-tunable periodicity, polls the server supplying the data.
- Using a Kftp-ls command a PDR file is detected in the ORNL DAAC-designated directory. The designated directory is a configurable operator parameter. An example of a directory name is /ECS/DRec.
- Acquires the Product Delivery Record file information via a Kftp “get” command - i.e., initiates a single file transfer from a remote server to a local host/workstation.

This data transfer mechanism is depicted in Figure 4-2.



**Figure 4-2. Polling with Product Delivery Record and Data Transfer at ORNL DAAC**

Once a PDR has been detected/acquired by ECS, the PDR is validated. In the event that the PDR is invalid, ECS automatically returns a Product Delivery Record Discrepancy (PDRD) via Kftp to the ORNL system. If the PDR is valid, ECS schedules to pull the data, one file at a time, using Kftp “get” command; in this case no PDRD is sent. If errors are detected during the ingest/archive process or the ingest/archive of the files is successful, ECS automatically returns an “Production Acceptance Notification” via Kftp to the supplier system. The definitions of the PDR, PDRD, the Production Acceptance Notification (PAN) file are described in the paragraphs which follow.

CH02

### 4.3.2.2 Product Delivery Record

The purpose of the PDR is to announce the availability of granule metadata or guide document and associated metadata files for transfer, including file names, location, and how long these files will be available in that location. The PDR is generated and placed on an ORNL server (e.g., daacl.esd.ornl.gov) in a pre-specified directory (e.g., /ECS/DRec) by the system supplying the data after the files referenced in the PDR are placed into their respective directories. The server and the directory are operator configurable parameters. ECS polls the system supplying the data, detects/acquires/validates the PDR, and schedules to pull the data.

CH02

CH02

The PDR consists of Parameter-Value Language (PVL) Statements. The required PDR PVL parameters are depicted in Table 4-1. The PDR PVL statements are ASCII strings, having at most 256 characters, in the form: “Parameter = Value;”. The Value strings shown in Table 4-1 include pre-defined values shown by single quote marks and processor determined values. Processor determined values include ASCII strings, International Standards Organization (ISO) times, and integers to be filled in with appropriate values by an ORNL processor during PDR creation. A sample PDR PVL is provided in Figure 4-3. The maximum allowed message length for a PDR is 1 megabyte. PDRs are validated to check that all required fields contain valid values and that the format of the PDR is correct and consistent with the standards. PDRs that adhere to the defined message standards shown in Table 4-1 are accepted and processed. Unique file names are assigned to each PDR using the following convention:

FILENAME = xxxx.epochal\_time.PDR

where

epochal\_time = time returned by the system function, measured in elapsed seconds (since January 1, 1970) --- 10 bytes are allocated. It represents the PDR creation time.

CH02

and

XXXX = “granule metadata name, guide document name, or guide document metadata name”

CH02

[ For example, FILENAME =XXXX.0013589462.PDR]

**Table 4-1. Required Product Delivery Record PVL Parameters**

Parameter	Description	Type/Format (Maximum/ Length in Bytes)	Value	
ORIGINATING_SYSTEM	Originator of Product Delivery Record	Variable String/ ASCII (20 B)	ORNL Server, e.g., 'ORNL_DAAC'	
TOTAL_FILE_COUNT	Total number of files to transfer	Integer/ ASCII (4 B)	1 - 9999	
EXPIRATION_TIME	ISO Time for data deletion from originating system. This time is set by the ORNL DAAC based on available resources.	Fixed String/ ASCII (20B)	GMT in the format: yyyy-mm-ddThh:mm:ssZ, where T indicates the start of time information and Z indicates "Zulu" time (operations tunable amount of time after PDR sent)	CH02
OBJECT	Start of file group parameters (repeat for each group of files)	Fixed String/ ASCII (10B)	'FILE_GROUP' <sup>(2)</sup>	CH02
DATA_TYPE	ECS Data Type	Variable String/ ASCII (20 B)	Valid ECS Data Type, TBS	
NODE_NAME	Name of network node on which the file resides	Variable String/ ASCII (64 B)	e.g., 'servername.ornl.gov'	
OBJECT	Start of file parameters (repeat for each file in file group)	Fixed String/ ASCII ( 9B )	'FILE_SPEC'	
DIRECTORY_ID	File directory name (i.e., path name)	Variable String/ ASCII (256 B) <sup>(1)</sup>	e.g., /ORNL/GROUP1/	CH02
FILE_ID	File name	Variable String/ ASCII (256 B) <sup>(1)</sup>	file name	CH02
FILE_TYPE	File Data Type	Variable String/ ASCII (20 B)	'METADATA' <sup>(3)</sup>	
FILE_SIZE	Length of file in bytes	Integer /ASCII (10 B)	<2*10 <sup>9</sup>	
END_OBJECT	End of file parameters (repeat for each file)	Fixed String/ ASCII (9 B)	'FILE_SPEC'	
OBJECT	Start of file parameters (repeat for each file in file group)	Fixed String/ ASCII (9B)	'FILE _ SPEC'	
DIRECTORY_ID	File directory name (i.e., path name)	Variable String/ ASCII (256 B) <sup>(1)</sup>	e.g., /ORNL/GROUP1/	CH02
FILE_ID	File name	Variable String/ ASCII (256 B) <sup>(1)</sup>	file name	
FILE_TYPE	File Data Type	Variable String/ ASCII (20 B)	'HTML', 'TEXT', 'PDF', 'POSTSCRIPT', 'RTF' <sup>(4)</sup>	
FILE_SIZE	Length of file in bytes	Integer /ASCII (10 B)	<2*10 <sup>9</sup>	
END_OBJECT	End of file parameters (repeat for each file)	Fixed String/ ASCII (9 B)	'FILE_SPEC'	
END_OBJECT	End of file group (repeat for each group of files)	Fixed String/ ASCII (10 B)	'FILE_GROUP'	

Note 1. Size can vary up to 256 bytes total when DIRECTORY\_ID is combined with FILE\_ID

Note 2. A file group consists of one file containing granule metadata, or multiple files containing document metadata and a guide document. One file in a file group containing a guide document would contain the document metadata and the other files in this file group would be the same guide document in different formats. A file group can contain only one document. Multiple formats of the same document can be included in the file group.

Note 3. Metadata can be granule or document metadata. Each document being ingested must have a corresponding metadata file.

Note 4. File type for guide documentation is equivalent to the documents format. The acceptable formats are HTML, text, PDF, Postscript and RTF.

<pre> ORIGINATING_SYSTEM = ORNL_DAAC; TOTAL_FILE_COUNT = 68; EXPIRATION_TIME = 1998-06-18T14:00:00Z; OBJECT = FILE_GROUP;     DATA_TYPE = xxxx;     NODE_NAME = servername.ornl.gov; OBJECT = FILE_SPEC;     DIRECTORY_ID = /ECS/DRec/staging/granule/;     FILE_ID = FIFE.META1.981126.06Z;     FILE_TYPE = METADATA;     FILE_SIZE = 75000; END_OBJECT = FILE_SPEC; END_OBJECT = FILE_GROUP; OBJECT = FILE_GROUP;     DATA_TYPE = xxxx;     NODE_NAME = servername.ornl.gov; OBJECT = FILE_SPEC;     DIRECTORY_ID = /ECS/DRec/staging/guide/;     FILE_ID = radiosonde data noaa.meta;     FILE_TYPE = METADATA;     FILE_SIZE = 10000; END_OBJECT = FILE_SPEC; OBJECT = FILE_SPEC;     DIRECTORY_ID = /ECS/DRec/staging/guide/;     FILE_ID = radiosonde data noaa.html;     FILE_TYPE = HTML;     FILE_SIZE = 35008; END_OBJECT = FILE_SPEC; END_OBJECT = FILE_GROUP;  ----- /* Repeat FILE_GROUP objects for each different file group */ ----- </pre>	<p><b>EXAMPLE ONLY</b></p> <p>CH02</p> <p>CH02</p> <p>CH02</p> <p>CH02</p>
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**Figure 4-3. Sample Product Delivery Record PVL**

Additional information on PVL can be found in the following documents:

- Consultative Committee for Space Data Systems (CCSDS), Parameter Value Language Specification (CCSD0006), Blue Book

#### 4.3.2.3 Product Delivery Record Discrepancy

The PDRD is sent by ECS to the ORNL system, via Kftp, only in the event that the PDR cannot be successfully validated. The PDRD indicates the error/success dispositions for filegroups in the PDR resulting from ECS's attempt to validate the PDR. There are two forms of PDRD, including a short form (Table 4-2) and long form (Table 4-3). The short form is used for PDRs

CH02

with errors in the PDR PVL that are not attributable to specific filegroups. The long form is used when one or more file groups in the PDR have invalid parameters; some file groups may be error-free. For each filegroup, if an error is encountered, ECS halts processing and reports the error which it just encountered for that filegroup. All remaining conditions in that filegroup are not validated. ECS processing then continues on with the next filegroup in the PDR. None of the files are transferred to ECS for processing until a corrected PDR is received and successfully processed. The PDRD consists of PVL Statements. Short and long PDRD PVL examples are provided, respectively, in Figure 4-4 and Figure 4-5. Unique names are assigned to each PDRD using the following convention:

FILENAME = xxxx.epochal\_time.PDRD

where

epochal\_time = PDR creation time - 10 bytes (see section 4.3.2 for details)

and

xxxx = "granule metadata name, guide document name, or guide document metadata name"

[For example, FILENAME = XXXX.0013589462.PDRD]

**Table 4-2. Short Product Delivery Record Discrepancy PVL Parameters**

Parameter <sup>2</sup>	Description	Type/Format (Length in Bytes)	Value <sup>2</sup>
MESSAGE TYPE	Short Delivery Record Discrepancy	Fixed String/ASCII(9)	SHORTPDRD
DISPOSITION	Disposition of IngestRequest <sup>1</sup>	Variable String/ASCII (64)	One of the following: "INVALID FILE COUNT" "ECS INTERNAL ERROR" "DATABASE FAILURES" "INVALID PVL STATEMENT" "MISSING OR INVALID ORIGINATING SYSTEM PARAMETER" "DATA PROVIDER REQUEST THRESHOLD EXCEEDED" "DATA PROVIDER VOLUME THRESHOLD EXCEEDED" "SYSTEM REQUEST THRESHOLD EXCEEDED" "SYSTEM VOLUME THRESHOLD EXCEEDED"

Note 1: In any given instance, only one disposition value is provided. In cases where multiple errors may exist, the disposition value corresponding to the first error encountered will be provided.

Note 2: Each parameter/value is followed by an EOL mark.

MESSAGE\_TYPE = SHORTPDRD;

**EXAMPLE ONLY**

DISPOSITION = "DATABASE FAILURES";

**Figure 4-4. Example Short PDRD PVL**

**Table 4-3. Long Product Delivery Record Discrepancy PVL Parameters**

Parameter <sup>2</sup>	Description	Type/Format (Length in Bytes)	Value <sup>2</sup>	
MESSAGE TYPE	Long Delivery Record Discrepancy	Fixed String/ASCII(8)	LONGPDRD	CH02
NO_FILE_GRP (to follow)	Number of File Groups	Integer/ASCII (4)	Number of File groups, in PDR, with errors	CH02
For each file group in the PDR				
DATA_TYPE	ECS Data Type	ASCII String (≤ 20)	DATA_TYPE in PDR	
DISPOSITION	Disposition of Ingest Request <sup>1</sup>	Variable String/ASCII (64)	One of the following: "SUCCESSFUL" "INVALID DATA TYPE" <sup>3</sup> "INVALID DIRECTORY" <sup>3</sup> "INVALID FILE SIZE" "INVALID FILE ID" <sup>3</sup> "INVALID NODE NAME" <sup>3</sup> "INVALID FILE TYPE" <sup>3</sup>	CH02

Note 1: For each file group, only one disposition value is provided. In cases where multiple errors may exist, the disposition value corresponding to the first error encountered will be provided. CH02

Note 2: Each parameter/value statement is followed by an EOL mark.

Note 3: Null string check only.

MESSAGE_TYPE = LONGPDRD;	<b>EXAMPLE ONLY</b>	CH02
NO_FILE_GRP = 3;		
DATA_TYPE = XXXX01;		
DISPOSITION = "INVALID DATA TYPE";		
DATA_TYPE = XXXX02;		
DISPOSITION = "SUCCESSFUL";		CH02
DAT TYPE = XXXX03;		
DISPOSITION = "INVALID FILE ID";		

**Figure 4-5. Example Long PDRD PVL**

#### 4.3.2.4 Production Acceptance Notification

After the data have been ingested/archived by ECS, ECS automatically sends a "Production Acceptance Notification (PAN)" via Kftp to the supplier system. The PAN file announces the completion of data transfer and archival, and identifies any errors or problems that have been encountered. There are two forms of the PAN available for use, including a short (Table 4-4) and a long (Table 4-5) form. The short form of the PAN is sent to acknowledge a successful data transfer or to indicate an error that affects all files defined in the PDR. If all files in a request do not have the same disposition, a long form of this message is employed. For each file in a filegroup, if an error is encountered, ECS halts processing and reports the error which it just encountered for that file. All remaining conditions in that file are not validated. ECS processing

CH02

then continues on with the next file in the filegroup. If there's no more file to process in the filegroup, ECS processing then continues on with the next filegroup in the PDR. The PAN consists of PVL Statements. Short and long PAN PVL examples are provided, respectively, in Figure 4-6 and Figure 4-7. Unique names are assigned to each PAN. The file naming convention is as follows:

CH02

FILENAME = xxxx.epochal\_time.PAN

where

epochal\_time = PDR creation time - 10 bytes (see section 4.3.2 for details)

CH02

and

xxxx = "granule metadata name, guide document name, or guide document metadata name"

CH02

[ For example, FILENAME = XXXX.0013589462.PAN]

**Table 4-4. Short Production Acceptance Notification PVL Parameters**

Parameter <sup>2</sup>	Description	Type/Format (Length in Bytes)	Value <sup>2</sup>
MESSAGE TYPE	Short Production Acceptance Notification	Fixed String/ASCII (8)	SHORTPAN
DISPOSITION	Disposition of Ingest Request <sup>1</sup>	Variable String/ASCII (64)	One of the following: "SUCCESSFUL" "NETWORK FAILURE" "UNABLE TO ESTABLISH FTP/KFTP CONNECTION" "ALL FILE GROUPS/FILES NOT FOUND" "FTP/KFTP FAILURE" "POST-TRANSFER FILE SIZE CHECK FAILURE" "FTP/KFTP COMMAND FAILURE" "DUPLICATE FILE NAME IN GRANULE" "METADATA PREPROCESSING ERROR" "RESOURCE ALLOCATION FAILURE" "ECS INTERNAL ERROR" "DATA BASE ACCESS ERROR" "INCORRECT NUMBER OF METADATA FILES" "INCORRECT NUMBER OF SCIENCE FILES" "INCORRECT NUMBER OF FILES" "DATA CONVERSION FAILURE" "REQUEST CANCELLED" "UNKNOWN DATA TYPE" "INVALID OR MISSING FILE TYPE" "FILE I/O ERROR" "DATA ARCHIVE ERROR"
TIME_STAMP	ISO Time when Destination System transferred the last part of the data	ASCII (20)	yyyy-mm-ddThh:mm:ssZ, where T indicates the start of time information and Z indicates "Zulu" time (Null if disposition is not "SUCCESSFUL")

CH02

CH02

CH02

CH01

CH01

CH02

Note 1: In any given instance, only one disposition value may be provided. In cases where multiple errors have occurred, the disposition value corresponding to the first error encountered will be provided.

Note 2: Each parameter/value statement is followed by an EOL mark.<sup>4</sup>

MESSAGE\_TYPE = SHORTPAN;

**EXAMPLE ONLY**

DISPOSITION = "INCORRECT NUMBER OF METADATA FILES";

TIME\_STAMP = 1996-06-23T09:46:35Z;

CH02

**Figure 4-6. Example Short PAN PVL**

**Table 4-5. Long Production Acceptance Notification PVL Parameters**

Parameter <sup>2</sup>	Description	Type/Format (Length in Bytes)	Value <sup>2</sup>
MESSAGE TYPE	Long Production Acceptance Notification	Fixed String/ASCII (7)	LONGPAN
NO_OF_FILES	Number of Files in PDR	ASCII (4)	TOTAL_FILE_COUNT parameter in PDR

For each File in the PDR

FILE_DIRECTOR Y	ASCII string specifying file directory location	ASCII (<256) Equivalent to PDR length	DIRECTORY_ID parameter in PDR
FILE_NAME	File names on system creating PDR	ASCII (<256) Equivalent to PDR length	FILE_ID parameter in PDR
DISPOSITION	Disposition of Ingest Request <sup>1</sup>	Variable String/ASCII (64)	One of the following: "SUCCESSFUL" "NETWORK FAILURE" "UNABLE TO ESTABLISH FTP/KFTP CONNECTION" "ALL FILE GROUPS/FILES NOT FOUND" "FTP/KFTP FAILURE" "POST-TRANSFER FILE SIZE CHECK FAILURE" "FTP/KFTP COMMAND FAILURE" "DUPLICATE FILE NAME IN GRANULE" "METADATA PREPROCESSING ERROR" "RESOURCE ALLOCATION FAILURE" "ECS INTERNAL ERROR" "DATA BASE ACCESS ERROR" "INCORRECT NUMBER OF METADATA FILES" "INCORRECT NUMBER OF SCIENCE FILES" "INCORRECT NUMBER OF FILES" "DATA CONVERSION FAILURE" "REQUEST CANCELLED" "UNKNOWN DATA TYPE" "INVALID OR MISSING FILE TYPE" "FILE I/O ERROR" "DATA ARCHIVE ERROR"
TIME_STAMP	ISO Time when Destination System transferred the last part of the data	ASCII (20)	yyyy-mm-ddThh:mm:ssZ, where T indicates the start of time information and Z indicates "Zulu" time (Null if disposition is not "SUCCESSFUL")

Note 1: In any given instance, only one disposition value may be provided. In cases where multiple errors have occurred, the disposition value corresponding to the first error encountered will be provided.

Note 2: Each parameter/value statement is followed by an EOL mark.

MESSAGE_TYPE = LONGPAN;	<b>EXAMPLE ONLY</b>	CH02
NO_OF_FILES = 3;		
FILE_DIRECTORY = /ORNL/GROUP1;		
FILE_NAME = FIFE.META1.981125.06Z;		
DISPOSITION = "UNABLE TO ESTABLISH FTP/KFTP CONNECTION";		
TIME_STAMP = 1996-04-28T23:49:59Z;		CH02
FILE_DIRECTORY = /ORNL/GROUP2		
FILE_NAME = BOREAS.META1.981125.00Z;		
DISPOSITION = "DATABASE ACCESS ERROR";		CH02
TIME_STAMP = 1996-11-28T21:39:49Z;		
FILE_DIRECTORY = /ORNL/GROUP3;		
FILE_NAME = AMAZ.META.981125.00Z;		
DISPOSITION = "ECS INTERNAL ERROR";		
TIME_STAMP = 1996-09-16T15:45:52Z;		CH02

**Figure 4-7. Example Long PAN PVL**

#### 4.3.2.5 Error Conditions /Error Handling

During the course of data exchange via Kftp, the following errors conditions may arise:

- Failure to establish TCP/IP connection
- Erroneous Kftp command
- File Not Found (listed in PDR, but not on disk)
- File Not Readable due to Permissions

Should a problem develop during a Kftp file transfer (for either a PDR or data transfer), due to any of the error conditions, an operator-tunable number of attempts are made to pull the data. The operator tunable number of attempts will be documented in the DAAC Operations Manual (DID 611).

#### 4.3.3 Deleted

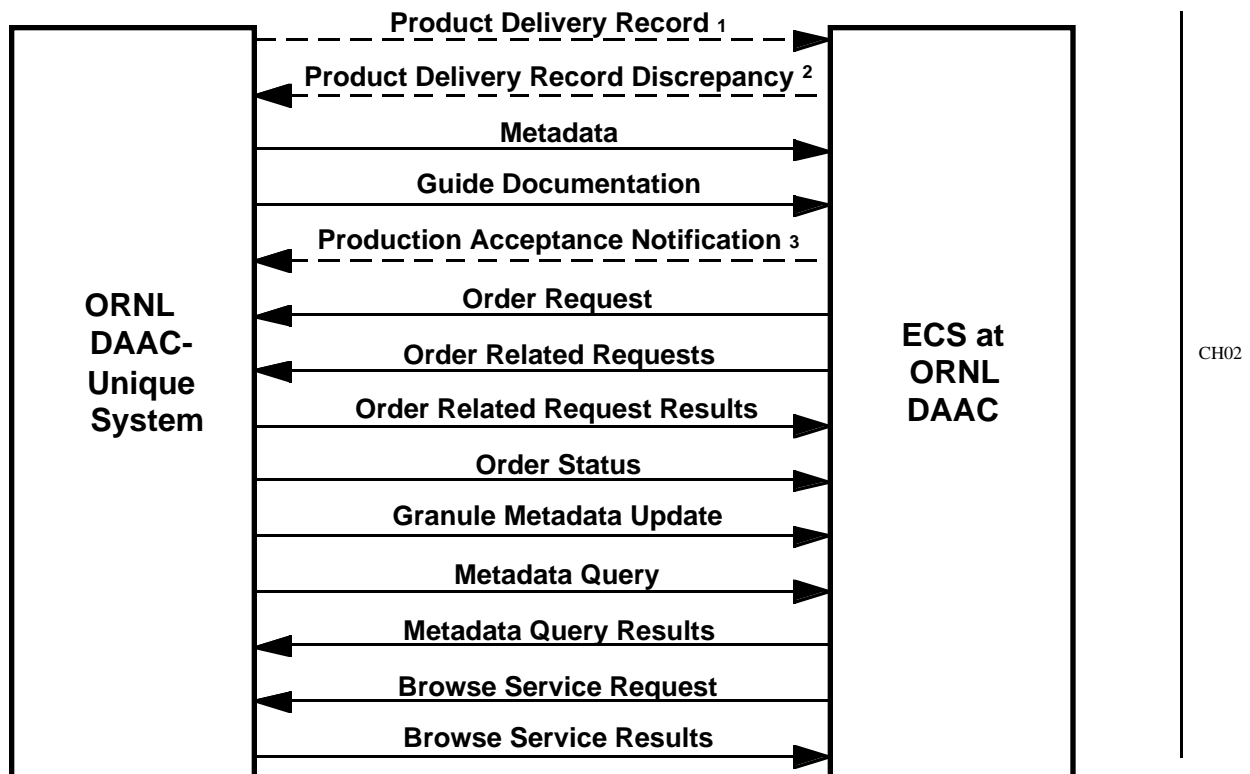
CH02

#### 4.3.4 Physical Media

Not currently supported at ORNL.

## 5. Data Flow Descriptions

Figure 5-1 identifies the data flows between the ECS and the ORNL DAAC-Unique System. Descriptions of the data exchange framework supporting these flows are found in Section 4 of this ICD. Each data flow shown in Figure 5-1 is described in this section. A description of each interface is provided. The direction of data flow is indicated. And if appropriate, the object classes that support a interface are identified along with a pointer to where design detail on the object class can be found.



Note 1,2, & 3: Defined in Section 4

**Figure 5-1. ECS - ORNL DAAC-Unique System Context Diagram**

### 5.1 Metadata (ORNL -> ECS)

The ORNL DAAC-Unique System provides granule metadata to ECS for insertion into the Metadata Catalog.

CH02

ORNL DAAC-Unique System is responsible for acquiring and ingesting products and generating associated metadata. Once the ORNL DAAC-Unique System creates a product on its system, it sends the associated metadata to ECS to be cataloged. In order for the ECS to maintain a catalog of ORNL's data, the ORNL DAAC-Unique System provides updates to the catalog as new data are acquired.

ORNL DAAC-Unique System provides core and product-specific metadata for their science products and guide documentation. The minimum core collection, document and granule metadata ORNL DAAC-Unique System provides to ECS is described in the document Release B Science Data Processing Segment (SDPS) Database Design and Database Schema Specifications for the ECS Project (DID 311). Note the data model in DID 311 (published in July 1996) has been modified. Modifications to the data model have been documented in the following technical papers. B.0 Earth Science Data Model (420-TP-015-001) and Backus-Naur Format (BNF) Representation of the B.0 Earth Science Data Model (420-TP-016-001). Collection metadata is input to ECS via the Collection-Level Metadata Population Tool. This HTML-forms GUI tool is based on DID 311 and the technical papers identified above, and is designed for use by the data provider. Collection metadata is not covered by this ICD. References for collection metadata are An ECS Data Provider's Guide to Metadata (163-WP-001-001) and The Role of Metadata in EOSDIS (expected available in April 1997).

ORNL's metadata is categorized as intermediate in the ECS core model. ECS validates the required core metadata, based on specified ranges of values. ORNL DAAC-Unique System metadata content with its associated values are specified in the ORNL Data/Metadata Design and Specifications Document (ORNL-MD-001-01). ORNL DAAC-Unique System does not require ECS to validate the metadata parameters; therefore, for non-required metadata, ECS checks only that the parameters exist and are in the correct format.

Metadata will be in the form of ODL statements. ODL accesses data which is kept in a hierarchical format using GROUP, OBJECT and PARAMETER hierarchy. An ODL statement is represented as "Parameter = Value". ODL only recognizes a character string value when it is in quotation marks. Comments in ODL are enclosed in delimiters as follows: /\*...comment...\*/. A detailed description of ODL can be found in the Planetary Data System Standards Reference and the University of Colorado Laboratory for Atmospheric and Space Physics: User's Guide for the Object Description Language (ODL) Processing Software Library, as listed in section 2 of this document.

CH02

## 5.2 Guide Documentation (ORNL -> ECS)

The ORNL DAAC-Unique System provides Guide Documentation to ECS for insertion into the Document Data Archive.

ORNL DAAC-Unique System is responsible for sending documentation to ECS for archiving. The ECS archive of ORNL specific documents will be as up to date as what is provided by the ORNL DAAC-Unique System to ECS.

Supported document formats are HTML, text, PDF, Postscript and RTF.

CH02

### 5.3 Order Request (ECS -> ORNL)

CH02

The ECS provides the ORNL DAAC-Unique System with Order Requests from the users in the form of Acquire Requests.

This interface includes requests for the ORNL DAAC-Unique System data holdings including correlative data and any Level 1 - 4 data. Since ECS does not provide the archives for ORNL's data products, ECS sends to the ORNL DAAC-Unique System order requests made through EOSDIS users. The ORNL DAAC-Unique System receives the order request and distributes the data products to the user identified by ECS.

This interface is supported by the ECS object class 'DsDdDistRequest'. Definition and format for this object class can be found in Release B SDPS Data Server Subsystem Design Specification (DID 305).

### 5.4 Order Related Requests/Results (ECS <->ORNL)

CH02

The interfaces related to the order request, e.g., resource utilization, order information, etc. are TBS.

### 5.5 Order Status (ORNL -> ECS)

CH02

ECS performs order management functions for all orders for ORNL products. To accomplish this, the ORNL DAAC-Unique System sends status state changes of the order as they happen.

This interface is supported by three ECS object classes: 'EcAcOrder' contains order specific information and status, 'EcAcRequest' contains data and status for the processing of the order and 'EcAcOrderCMgr' is the client object to pass order and request instance object to the MSS Order/Request tracking server. The definition, format and usage of these object classes can be found in the API IDD (DID 819).

CH02

### 5.6 Granule Metadata Update (ORNL -> ECS)

ORNL may determine granule metadata which had been made available and ingested by ECS needs some changes or corrections.

The interface for granule metadata update is supported by the ECS object class 'DsC1ESDTReductionCollector'. Definition and format for this object class can be found in Release B SDPS Data Server Subsystem Design Specification (DID 305). An additional source of information for granule metadata update is the ECS API IDD (DID 819).

CH02

### 5.7 Metadata Query/Results (ORNL <-> ECS)

CH02

This interface supports metadata queries made by ORNL DAAC-Unique subsystems. ECS maintains catalogs of all ECS-accessible ORNL data products metadata. This interface also includes the query results that is sent from ECS to the ORNL DAAC-Unique subsystems. The interface for metadata query is supported by the ECS object class DsC1ESDTReductionCollector'.

The interface for metadata results is supported by the ECS object class 'DsClRequest'. Definitions and formats for these object classes can be found in Release B SDPS Data Server Subsystem Design Specification (DID 305).

## 5.8 Earth Science Data Type (ESDT) Associated Interfaces

CH02

ORNL DAAC-Unique System will utilize capabilities available via ESDT structures in ECS. Information on ESDTs can be found in the following documents; An ECS Data Provider's Guide to Metadata in Release A (DID 163), The Population Process for ECS Metadata in Release A (DID 420) and TBS.

### 5.8.1 Browse Service Request (ECS -> ORNL)

CH02

The ORNL Browse images are stored on an ORNL server rather than an ECS server. A browse service request in the form of a retrieve request is sent from ECS to the ORNL DAAC-Unique System. ORNL is responsible to retrieve the requested image from its archives and perform any specified services that ORNL has requested ECS to advertise. These images are then made available to ECS.

This interface is supported by the ECS object class 'DsStArchive'. Definition and format for this object class can be found in Release B SDPS Data Server Subsystem Design Specification (DID 305).

### 5.8.2 Browse Service Result (ORNL-> ECS)

CH02

ORNL DAAC-Unique System sends the browse image requested to ECS as stipulated in the retrieve request.

This interface is supported by the ECS object class 'GLParameterList'. Definition and format for this object class can be found in Release B SDPS Data Server Subsystem Design Specification (DID 305).

## Appendix A.

### Work-off Plan for Release B ECS-ORNL DAAC ICD

ICD Issue #	ICD Para. #	Issue Priority *	ICD Issue Type - Description	Work-off Plan Task(s)	Projected Resolution Date	Risk Assessment**
Deleted						
2	Table 4-1	B	DATA TYPE needs to be defined, TBS	ECS Science office visit to ORNL 2nd quarter 1997. ORNL will determine if more information is needed from ECS. Once information is made available ORNL will identify their required ESDTs, from which data types will be derived.	12/97	No impact until Release B.1 CSR.
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5	5.4	A	Order Related Requests/Results is a place holder for interfaces not yet defined that are needed to support the order request, MSS related, e.g. billing, accounting, etc., TBS	ECS define APIs and logging needed to support order process.	12/97	Potential impact on ORNL in their development effort.
6	5.5	A	Order Related Requests/Results is a place holder for interfaces not yet defined that are needed to support the order request, DDIST related, acknowledgement messages/data to ECS and ORNL , e.g. Abort WaitForCompletion, Estimate, SetPriority, GetResourceID, etc., TBS	ECS define APIs and logging needed to support order process.	12/97	Potential impact on ORNL in their development effort.
7	5.8	A	TBS, pointer to ESDT Release B reference document(s)	ECS add ESDT Release B references when available	10/97	Potential impact on ORNL in their development effort.

\* Issue Priority Definition:

A = Design impact; e.g., unresolved interface.

B = Minimal design impact; e.g., content or format of a specific field unresolved.

C = No design impact - administrative detail; e.g., reference document # not available.

\*\* Risk Assessment Definition:

- Risk if issue is not resolved by projected resolution date

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## Abbreviations and Acronyms

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ACL	Access Control List
API	Application Programmer Interface
CCB	Configuration Control Board
CCR	Configuration Change Request
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CSMS	Communications and System Management Segment
DAAC	Distributed Active Archive Center
DCE	Distributed Computing Environment
DCN	Document Change Notice
ECS	EOSDIS Core System
EOL	end of line
EOS	Earth Observing System
EOSDIS	EOS Data and Information System
ESDIS	Earth Science Data and Information System
ESDT	Earth Science Data Type
ESnet	Energy Sciences Network
FDDI	Fiber Distributed Data Interface
FTP	File Transfer Protocol
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
I&T	integration and test
I/F	interface
ICD	Interface Control Document
IP	Internet Protocol
IRD	Interface Requirements Document

ISO	International Standards Organization	
Kftp	Kerberos File Transfer Protocol	
LAN	Local Area Network	
MB	Megabyte ( $10^6$ bytes)	
N/A	Not Applicable	
ODL	Object Description Language	CH02
OODCE	Object Oriented Distributed Computing Environment	
ORNL	Oak Ridge National Laboratory	
OSF	Open System Foundation	CH02
PAN	Production Acceptance Notification	
PDR	Product Delivery Record	
PDF	Portable Data Format	CH02
PDRD	Product Delivery Record Discrepancy	
PVL	Parameter Value Language	
RPC	Remote Procedure Call	
RTF	Rich Text Format	CH02
SDPS	Science Data Processing Segment	
SMTP	Simple Mail Transfer Protocol	
SNMP	Simple Network Management Protocol	
TBD	To Be Determined	
TBR	To Be Reviewed, To Be Resolved	
TBS	To Be Supplied	
TCP	Transmission Control Protocol	
TCP/IP	Transmission Control Protocol/Internet Protocol	
V0	Version 0	
V1	Version 1	